In the Claims:

1. (Withdrawn) An immersion lithographic system comprising:

an optical surface;

a wafer support for holding a workpiece; and

an immersion fluid with a pH less than 7, disposed between the optical surface and the wafer support, said immersion fluid contacting at least a portion of the optical surface.

2. (Withdrawn) The system of claim 1 wherein the immersion fluid comprises water.

3. (Withdrawn) The system of claim 2 wherein the pH of said immersion fluid is in the range of 2 to 7.

4. (Withdrawn) The system of claim 3 wherein the pH of said immersion fluid is in the range of 4 to 7.

5. (Withdrawn) The system of claim 4 wherein the pH of said immersion fluid is in the range of 5 to 7.

6. (Withdrawn) The system of claim 5 wherein the pH of said immersion fluid is in the range of 6 to 7.

7. (Withdrawn) The system of claim 1 wherein the immersion fluid comprises hydrogen ions with a concentration in the range of 10^{-7} to 10^{-2} mole/L.

8. (Withdrawn) The system of claim 1 wherein the immersion fluid comprises hydrogen ions with a concentration in the range of 10^{-7} to 10^{-4} mole/L.

9. (Withdrawn) The system of claim 1 wherein the immersion fluid comprises hydrogen ions with a concentration in the range of 10^{-7} to 10^{-5} mole/L.

10. (Withdrawn) The system of claim 1 wherein the immersion fluid comprises hydrogen ions with a concentration in the range of 10^{-7} to 10^{-6} mole/L.

11. (Withdrawn) The system of claim 1 wherein the optical surface comprises silicon oxide.

12. (Withdrawn) The system of claim 1 wherein the optical surface comprises fused silica.

13. (Withdrawn) The system of claim 1 wherein the optical surface comprises calcium fluoride.

14. (Withdrawn) The system of claim 13 further comprising a fluoride-containing compound dissolved in the immersion fluid.

15. (Withdrawn) The system of claim 14 wherein the fluoride containing compound comprises at least one material selected from the group consisting of sodium fluoride, potassium fluoride, hydrogen fluoride, and combinations thereof.

16. (Withdrawn) The system of claim 13 wherein the immersion fluid comprises fluoride ions with a concentration in the range of greater than 0.01 mole/L.

17. (Withdrawn) The system of claim 16 wherein the immersion fluid comprises fluoride ions with a concentration in the range of greater than 0.05 mole/L.

18. (Withdrawn) The system of claim 17 wherein the immersion fluid comprises fluoride ions with a concentration in the range of greater than 0.1 mole/L.

19. (Withdrawn) The system of claim 1 further comprising a semiconductor structure on the wafer support structure, said semiconductor structure having a topmost photosensitive layer.

20. (Withdrawn) The system of claim 19 wherein the photosensitive layer comprises a chemically amplified photoresist.

21. (Withdrawn) The system of claim 19 wherein the immersion fluid is in contact with a portion of the photosensitive layer.

22. (Withdrawn) The system of claim 19 wherein the semiconductor structure is immersed in the immersion fluid.

23. (Withdrawn) The system of claim 19 wherein the semiconductor structure comprises an integrated circuit that includes transistors with a gate length not greater than 50 nm.

24. (Withdrawn) The system of claim 19 wherein the wafer support is immersed in the immersion fluid.

25. (Withdrawn) An immersion lithographic system for projecting light having a wavelength of less than 197 nm, the system comprising:

an optical surface;

water with a pH less than 7, said water contacting at least a portion of the optical surface; and

a semiconductor structure having a topmost photoresist layer, a portion of said photoresist being in contact with the water.

26. (Withdrawn) The system of claim 25 wherein the pH of the water is in the range of 2 to 7.

27. (Withdrawn) The system of claim 26 wherein the pH of the water is in the range of 5 to 7.

28. (Withdrawn) The system of claim 27 wherein the pH of the water is in the range of 6 to 7.

29. (Withdrawn) The system of claim 25 wherein the optical surface comprises silicon oxide.

30. (Withdrawn) The system of claim 25 wherein the optical surface comprises calcium fluoride.

31. (Withdrawn) The system of claim 25 further comprising a fluoride containing compound dissolved in the water.

32. (Withdrawn) The system of claim 31 wherein the fluoride containing compound comprises at least one material selected from the group consisting of sodium fluoride, potassium fluoride, hydrogen fluoride, and combinations thereof.

33. (Withdrawn) The system of claim 25 wherein the water comprises fluoride ions with a concentration in the range of greater than 0.01 mole/L.

34. (Withdrawn) The system of claim 25 wherein the photoresist layer comprises a chemically amplified photoresist.

35. (Withdrawn) The system of claim 25 wherein the semiconductor structure is immersed in the water.

36. (Withdrawn) The system of claim 25 further comprising a wafer support underlying the semiconductor structure.

37. (Withdrawn) The system of claim 36 wherein the wafer support is immersed in the water.

38. (Currently Amended) A method for illuminating a semiconductor structure having a topmost photoresist layer, comprising the steps of:

providing the semiconductor structure comprising an integrated circuit that includes transistors with a gate length not greater than 50 nm, the structure coated with the topmost photoresist layer, the topmost photoresist layer comprising a chemically amplified photoresist that forms a photo-generated acid catalyst of the form HA, where H is hydrogen;

introducing an immersion fluid comprising water and a fluorine containing compound into a space between an optical surface that is soluble in water and the photoresist layer, said immersion fluid having a pH of less than 7 and the water in contact with a portion of the photoresist layer;

directing optical energy through the immersion fluid and onto said photoresist layer; and

subsequently developing the photoresist layer.

39. (Canceled)

40. (Previously Presented) The method of claim 38 wherein the pH of the immersion fluid is between 2 and about 7.

41. (Previously Presented) The method of claim 40 wherein the pH of the immersion fluid is between 4 and about 7.

42. (Previously Presented) The method of claim 41 wherein the pH of the immersion fluid is between 5 and about 7.

43. (Previously Presented) The method of claim 42 wherein the pH of the immersion fluid is between 6 and about 7.

44. (Original) The method of claim 38 wherein the immersion fluid comprises hydrogen ions with a concentration in the range of 10^{-7} to 10^{-2} mole/L.

45. (Original) The method of claim 44 wherein the immersion fluid comprises hydrogen ions with a concentration in the range of 10^{-7} to 10^{-4} mole/L.

46. (Original) The method of claim 45 wherein the immersion fluid comprises hydrogen ions with a concentration in the range of 10^{-7} to 10^{-5} mole/L.

47. (Original) The method of claim 46 wherein the immersion fluid comprises hydrogen ions with a concentration in the range of 10^{-7} to 10^{-6} mole/L.

48. (Original) The method of claim 38 wherein the optical surface comprises silicon oxide.

49. (Original) The method of claim 38 wherein the optical surface comprises calcium fluoride.

50. (Canceled)

51. (Canceled)

52. (Previously Presented) The method of claim 38 wherein the fluorine containing compound comprises a compound selected from the group consisting of sodium fluoride, potassium fluoride, hydrogen fluoride, and combinations thereof.

53. (Previously Presented) The method of claim 49 wherein the immersion fluid comprises fluoride ions with a concentration in the range of greater than 0.01 mole/L.

54. (Original) The method of claim 49 wherein the immersion fluid comprises fluoride ions with a concentration in the range of greater than 0.05 mole/L.

55. (Original) The method of claim 49 wherein the immersion fluid comprises fluoride ions with a concentration in the range of greater than 0.1 mole/L.

56. (Canceled)

57. (Canceled)

58. (Original) The method of claim 38 wherein the semiconductor structure is immersed in the immersion fluid.

59. (Original) The method of claim 38 further comprising a wafer support underlying the semiconductor structure.

60. (Original) The method of claim 59 wherein the wafer support is immersed in the immersion fluid.

61. (Canceled)

62. (Previously Presented) The method of claim 38 wherein the step of developing the photoresist layer comprises immersing the photoresist in a tetramethylammonia hydroxide solution.

63. (Previously Presented) A method for illuminating a semiconductor structure having a topmost photoresist layer, comprising the steps of:

providing the semiconductor structure comprising an integrated circuit that includes transistors with a gate length not greater than 50 nm, coated with the topmost photoresist layer, the topmost photoresist layer being a chemically amplified photoresist that forms a photo-generated acid catalyst of the form HA, where H is hydrogen;

introducing water having a fluorine containing compound dissolved therein into a space between an optical surface that is soluble in water and formed of a material including fluoride and the layer, said water having a pH of less than 7, the water contacting a portion of the optical surface and a portion of the photoresist layer;

directing light with a wavelength of less than 450 nm through the water and onto said photoresist; and

subsequently developing the photoresist layer.

64. (Previously Presented) The method of claim 63 wherein the pH of the water is in the range of 2 to about 7.

65. (Previously Presented) The method of claim 64 wherein the pH of the water is in the range of 5 to about 7.

66. (Previously Presented) The method of claim 65 wherein the pH of the water is in the range of 6 to about 7.

67. (Original) The method of claim 63 wherein the optical surface comprises silicon oxide.

68. (Original) The method of claim 63 wherein the optical surface comprises calcium fluoride.

69. (Canceled)

70. (Previously Presented) The method of claim 63 wherein the fluorine containing compound comprises a compound selected from the group consisting of sodium fluoride, potassium fluoride, hydrogen fluoride, and combinations thereof.

71. (Original) The method of claim 63 wherein the water comprises fluoride ions with a concentration in the range of greater than 0.01 mole/L.

72. (Canceled)

73. (Original) The method of claim 63 wherein the semiconductor structure is immersed in the water.

74. (Original) The method of claim 63 further comprising a wafer support underlying the semiconductor structure.

75. (Original) The method of claim 74 wherein the wafer support is immersed in the water.